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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Civilian Mental Health In Wartime*

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New York, New York

As may be expected, civilian mental health in wartime is subjected to stress and strain which is revealed in a variety of ways. There are gross mental disorders—the psychoses—that demand hospitalization and usually legal commitment. These disorders can therefore be recorded. There are lesser deviations that are often equally incapacitating—the psychoneuroses—the severe that are overt enough to be known in the community; the mild that may be known only to the man himself or his family; the sub-clinical that are not recognized as disorders even by the victim himself but rather as extreme likes, dislikes and sensitivities. Only an experienced professional person can see these as illnesses. And then there is the acute transient neuroses that may befall the average person when he is put under sufficiently great strain. It is of importance that such strains seldom occur in civilian life. It takes a Guadalcanal or its equivalent to load down a person with infection such as malaria, with lack of sleep, insufficient food, constant noise, separation from security and prolonged threat of death, to bring this disorder to the fore. There are the psychopathic persons who nibble at the mores and laws and produce a continuous stream of clients for our courts. Their self direction is so poor that they crop up wherever cultural constraints weaken. And often more threatening to us as a people, are those chronically unhappy persons who are full of all sorts of isms, the demagogues who become the tools of Fascists.

A recent report on anti-semitic activities by gangs in New York demonstrates that this hoodlumism is symptomatic of long continued dissatisfactions and family disruptions. Although these miscreants may erupt at any time, during wartime the restraining thickness of our culture is particularly thin and is insufficient to contain them. This group of overt aggressors is probably less significant than the disguised ones who have intelligence enough to time their activities in order that they may be most effective. We have to be on the watch for them.

There is the popular notion that mental incapacitation is augmented under worry, pressure and adversity. Maybe some day we shall discover that there is as much truth in this popular notion as there is in many other popular notions, but we at the same time need be careful that we do not project upon others what we would consider to be adversity. We need to recognize how personal a thing adversity is. How adversity for one person becomes a prod, for another a crushing experience; how a worry that crowds out good things in life for this person crowds out the ill for another. And so war can be rated a priori as neither hygienic nor unhygienic in the abstract or even weighted toward one or the other in the aggregate.

* Read before The Institute of Medicine of Chicago, November 1, 1944.

The confusion, worry and unhappiness of today are merely precipitating factors in the face of deeper disability. They are not a fundamental cause as evidenced by the amount that can be assimilated by the average soldier in combat without a break.

Statistics of mental hospital admissions and the count of patients are not satisfactory criteria in evaluating civilian mental health. There are so many other things that may enter to produce these figures: availability of beds, limitations of personnel, the fact that many men are away in the army and some are in military hospitals and numerous other factors.

Comparison of records as to civilian mental health now and during the first World War is difficult. The readiness of the public to accept hospital service, the refinements of diagnosis, the influence of shock therapy in reducing hospital populations, and a number of other factors have created a changed situation. In spite of the difficulty of interpreting and comparing figures it may be of interest to see what there is. Three state departments with excellent statistical facilities have been consulted.

One state records a falling off in hospitalization during both world wars, but in 1921 there was a rebound. Such a picture poses a number of questions. Was the incidence of psychoses reduced during the war? Were the patients able to find a place in industry and thus become economically self-supporting, whereas otherwise they would have been hospitalized? Did the increase in the provision of facilities stop in wartime and so limit the admissions? Are the military hospitals taking care of a number that would ordinarily have appeared in civilian hospitals? I do not know the answers.

A second state presented a record of reduced admissions and census over the past two years. For this state we can pose the same questions. We actually know that this state has allocated a large number of hospital beds to the armed forces and its capacity has thereby been theoretically reduced.

The third state reports its experience as follows:

"In the six-year period of World War I, 1914-1919, the apex of mental hospital admissions was reached in 1918, showing a twenty-two per cent rise over the 1914 admissions, and dropping back to a 13 per cent increase in 1919. In World War II, beginning in 1939 an increase of 12 per cent was recorded in admissions in the two years 1941 and 1942, with a decline to 5 per cent in 1943 the same per cent increase as the 1940 admissions.

The mental hospital population showed a gradual rise over the six years in World War I and recorded the highest increase of 13 per cent in the two years 1918 and 1919. So far in World War II the mental hospital population showed a somewhat measured increase of only 5 per cent in 1942 and 1943 over 1939, and the increase is estimated at 4 per cent in 1944.

It needs to be pointed out, however, that the actual number of admissions is about twice as high in World War II as contrasted with the figures of World War I. Likewise, the mental hospital population ratio of World War II is about two and one-third over World War I.

The larger numbers of mental patients of World War II are accounted for primarily because of the growth in the general population itself. Other factors are, however, the more general use of mental hospitals in recent years. In this the transformation of asylums and other custodial institutions into hospitals for the treatment of mental disease is a factor of great importance. It is now generally recognized that mental patients need expert treatment. The common observations that many patients are benefited in these institutions and return to their homes to resume their former occupation has strengthened the confidence of the people in the efficacy of the treatment afforded. It has broken down much of the prejudice against institutional treatment of the insane. An increasing number of voluntary patients entering our mental hospitals corroborates the views just expressed.

Patient 'Turnover' Accelerated

One of the important reasons to be ascribed to the slowing up of the general trend toward an increasing mental hospital patient population in recent years is the shortening of the patients stay in mental hospitals due to the more concentrated and effective treatment methods including the extensive application of shock therapy.

A study of the patient 'turnover' in the three State Hospitals in two five-year periods shows a more accelerated movement of the patients through the hospitals in the second five-year period.

Increase in Aged Patients

Mental diseases, especially those associated with old age, have increased in incidence as medical improvements are tending to lengthen the life span. This is reflected in the changing age distribution of first admissions to mental hospitals.

Neuropsychiatric Selective Service Rejectees

One of the disquieting phenomena in the psychi-

atric examination of our selective service registrants was the sizeable proportion rejected for apparent neuropsychiatric disabilities and the deep concern expressed over the possibilities that their somewhat minor disabilities may develop into serious mental disturbances.

Our experience over the last few years fortunately has not confirmed these anticipated trends. It would seem that the majority of those rejected for neuropsychiatric reasons were able to continue to function fairly satisfactorily in the social and economic evironment of their own communities, and in their customary family life as they did before they were considered for military service.

Mental Hygiene Program

Following the closing of hostilities there will arise the task of rehabilitating those soldiers who have manifested mental disabilities. It is important that adequate veterans' neuropsychiatric facilities be provided for those who need hospital care and extensive mental hygiene clinic and other rehabilitative facilitis be provided for those returning to their home communities.

In the community as a whole we must develop appreciation of the importance of early recognition in nervous and mental disorders and the importance of correcting minor mental disturbances which may be contributory factors to more serious ailments in the future; and the development of means by which all persons who show signs of mental disturbances, however slight, may be assured of early attention and appropriate treatment.

Now and in the days to come conscious efforts will have to be made to spread the knowledge of the principles of mental hygiene as a program to foster and maintain sound mental health among all the people."

There is one set of statistics, however, that can be taken more on face value and for that reason they challenge our imagination and curiosity. These are the figures on suicide. This is a retreat that is open to everybody at all times and yet the incidence of suicide fluctuates with the times and war seems to be a period of low incidence. In the United States the rates for the five years 1938 to 1942 inclusive were respectively: 15.3; 14.1; 14.3; 12.9 and 12 per 100,000. Does war make life more meaningful? Certainly it makes life fuller, although on the other hand the wastage of war may argue for the opposite. The lowest figure 12 for 1942 may not be the simple reduction, that 3 per 100,000 who would have died thus in 1938 failed to do so. It may mean that in the case of many people war has brought about conditions that encourage suicide and some who would not have taken this way out in 1938 did so in 1942, whereas with other people there has been a reverse effect.

Dr. Otto Kant[1] reflecting experience from Germany in the first World War says the strain and stresses of the war experience, with its demand not only on the soldier but also on the civilian population, did not produce an increase in the ordinary major psychoses.

David M. Olkon[2] reflects some of the negative influences of the war as follows: "Interesting in this connection is the information from the Cook County Psychopathic Hospital that since the war began a great number of females—wives, mothers, grandmothers, sisters and sweethearts of soldiers —have been committed. Many of these mental breakdowns are traceable to fears and apprehensions for the safety of husband, son, sweetheart, or brother. This fact impresses one with the possible remote effects of war on the population at large."

This is in line with the report by Tikhon I. Yudin[3] who has found that in Russia neuroses and psychoses are less among civilians, but that disorders are more among women at the climacteric and men suffering from arteriosclerosis.

Thus in the realm of mental ill-health where the disease is gross and unquestionable, there is little evidence that war is a disastrous experience. Perhaps when we come to those states of relative ill-health—the neuroses—we have greater freedom to exercise our interpretative propensities. It is here that case by case of personal effectiveness can be paralleled wih current or more recent life experiences. It is here also that we are not embarrassed by statistics. Each case can be studied on its own merits. If we find the war is a cause of disability in one case we can say that war may create ill-health. If we find it salutary in another case we are not embarrassed in saying that the ill wind may also blow good. In fact we may find the winds variable in the same case.

Felix Deutsch in a study of civilian war neuroses concludes that there are often neuroses of a more complex social organism than the person. They are an imbalancing

of a family. The members of a family reach a degree of equilibrium, it is not always a happy balance. In fact hostility may be counterpoised with other hostility. Yet it is balance. When one member of this balanced situation is changed or weakened or eliminated the whole group is thrown off balance. It is like the grove of trees that have grown up together and formed their own protective crown against the elements, and their own broad mutually sustaining rootage. The loss of one tree opens up the defense and the next storm penetrates and takes its toll. Deutsch found that civilian neurosis is a composite of war and peace time factors. The civilian may remain in his normal group and at the same time he must acquire a war morale without the designed aids that bolster the soldier. He may even lose the ties of his normal group. He experiences social change, privation and restriction. These threaten his integrity and induce neurotic reactions. He is subjected to the composite of qualms and disaffections that surround him. If he is of military age he is on the one hand impelled to believe in his virility while denied for one reason or another the opportunity to be a warrior, or on the other hand to avoid the responsibilities of adult male citizenship while all sorts of pressures impel him otherwise. He may find it very disturbing to feel a hate that he had previously identified with savagery. He cannot with equanimity give up a distasteful but essential job knowing that the man in service has to swallow his distaste. The soldier can project his resentment about restriction on something definite—the army; the civilian is left only with himself to attack. It must be kept in mind that it is so often the very sensitive who have been rejected or otherwise disqualified for service who remain to face these issues as civilians.

Rationing both in World War I and in this war has proved to be something of a barometer of our weaknesses. We face no threat of starvation. We have plenty to eat, plenty to meet our nutritional needs. But another virtue of food is upset. Food has a symbolic value, often extremely individual that defies all rationing. About food centers our earliest emotional ties, our cohesiveness as a family, the security of our relation to others. It is much less embarrassing to admit a dependence on a characteristic family food than to admit being tied to apron strings. Many people go through life with this token dependence. When it is threatened they go to great lengths to secure it, shopping from store to store, waiting long in line, supporting black markets. These things are symptomatic and at times become preoccupying to the point of incapacitation.

The war has shown that that which we have called a neurosis is the negative side of a human quality that may be either good, bad, or indifferent. This quality loosely described is a focalized (sometimes polyfocal) hypersensitivity and hyperreactivity. War uncovers many such foci that remain covert in peace time. War drags people into situations where they have not established defenses against or constructed opportunities for constructive use of a sensitivity. This indifferent focal sensitivity and reactivity may in some situations be incapacitating. It is then a neurosis. It may become, however, under favorable conditions a talent. It may exist in such diffuse form as to be always incapacitating. It is this polyvalency of these sensitivities that makes a rejection from the services for neurosis a potentially destructive designation. If we had a term that meant neurosis-with-respect-to-army-life we would protect many talents.

Levy's[4] studies of children have done much to show in magnification the dynamics of change in family life issuing from the war. He has shown that the results are not inherent in the incident of war but rather in the personality structure affected by the incident. In some cases an incident works good, in others the reverse. If one focuses on the effects of war on adults and family life he is better prepared to understand the significance of the present period on children who grow up in the atmosphere (or absence) of these adults and on the development of the focalized sensitivities and reactivities that have just been referred to.

Bossard[5] phrases this as follows:

"Not all the effects of war upon the family are problem-provoking. Like other adversities, war

often binds families closer together. Suffering may weld relations most durably. The realities of war dwarf many of the trivialities of life into insignificance, and this helps to reveal its abiding fundamentals. War calls forth a spiritual rejuvenation which may recreate the inner meaning of family life. Many a married couple, casual in the indifferent intimacy of the years, find new bonds in a common anxiety for children in their country's service. Other couples find inspiration in the idealism of wartime services, and translate this psychic renewal into their marital relations. The background of a national crisis places in proper perspective the domestic squabbles and triangles which seem so important in more placid days.

Not all wartime separations produce tension. A man and wife separated by half the world may come, perhaps for the first time, to assess their true devotion to each other. Thus, good husbands may be born in the discomforts of military barracks, and more forebearing wives be resolved in the loneliness of their wartime estate.

War tries men's souls. If some are weighed and found wanting, if others are lost in the process of weighing, there still are many who discover new personal values in meeting the trial.

The historical evidence on the positive side is scant. Only, it must be so. If war were so devastating of family life as some students have indicated, then the family could not have survived its history. The resiliency of the family—that is its answer to the wars of the past. The family has survived many wars."

Dr. Levy found on the positive side that the conditions of war had in many instances drawn families together and enhanced the feelings of one member for another. The security of increased income at times helped this along. Difficulties that previously had loomed large now against a background of war appeared insignificant and privations and sacrifices had brought members of a family together and also developed a sympathetic attitude on the part of persons outside of the family. Men who had lost status as family heads during the depression had been able to regain their position. The absence of servants and the restrictions on traveling by automobile have often restored families and eliminated some of the class distinction that constrains spontaneity. The opportunity for voluntary service has made possible enrichment of life on an altruistic basis and many who have tended to lead rather ordinary lives have been drawn out into a broader range of contacts.

Industry has opened up an opportunity for emancipation without embarrassment for those of the younger group who are not fitted for the regular school program. Similarly some parents who have limited parental endurance and some who have made household slaves of themselves have found relief from tension or guilt in war work. The family is correspondingly mellowed.

The unusual opportunities for employment have also worked to the advantage of the unemployed aged who thought themselves shelved and the younger disabled who had rated themselves as permanent dependents. There has been real occupational therapy and many have risen above the level of dependency both economically and psychologically. Those who have felt themselves excess baggage in the lives of others have had at least a respite from this and a possibility of a more favorable comparison. The father who stayed at home and cared for the children while his wife worked is now able to assume his normal family status.

Similarly minority groups against which occupational prejudices were expressed are having their days of relief and are having an opportunity to establish evidence of their worth.

All of these positive experiences encourage us to take certain directions in the post war period. They encourage us to strengthen family life in every way possible through the school, through more joint family enterprises, through financial security for the family and through ego opportunities often found in volunteer services to the community. There is probably no more important step to be taken in de-sensitizing our population to demagogy and isms than to create for members of the family a more satisfactory family and community status and especially to make the head of the family a better father and citizen. There is need also for more perspicacious view and provision for women in industry. These are all things that have to be dealt with by calculated action and not left to chance.

But these positive values of the war are to a degree balanced by disadvantages. Privation in some cases has become a liability

and increased income has become a basis of demoralization for those unable to deal wisely with abundance. Emancipation has been unduly accelerated in the case of some adolescents and children have been frequently neglected because mothers have been drawn off into war work. The spiritual impoverishment of the home through the loss of members in this way has deprived growing children of the sort of contact with parents that is so essential to full development. And parents have found children running wild on this account. The higher incidence of juvenile delinquents, at least in many places, is an expression of the rapid effect on mental health that is more apt to show itself in the statistics than are the gross psychopathological disorders. Since some of the disturbances are of growth that incapacitate the individual for future functions, it may be expected that the toll of war will have to be reckoned in years to come. Whereas in some cases the responsibility for the older children in the family through the absence of the mother have had positive value, in others they have actually been an undue burden, especially when accompanied by anxiety about separation from the mother. Families that have integrated themselves around one member find themselves without this member. A father away in industry, or son away at war is no longer able to serve as an integrating focus and the family solidarity suffers.

All of these problems emanating from the war indicate that reparative and preventive steps have to be taken, but there is no rule of thumb to indicate in the individual case what these must be. They require professional judgment based on diagnostic acumen of the doctor and others. There is not much we can do to enhance this acumen at this time. These problems are not new. They are only high lighted at the present time and the solutions that we are developing need to be kept in mind as a post war opportunity to be furthered by improvements in the professional education of a number of groups—physicians, clergymen, social workers, public health personnel, etc. Looking ahead it also indicates that there is need for financial and collaborative support of protective, recreational and health agencies far beyond what has been provided in the past.

Practically all that I have presented has had to do with the effect of the war situation on the production or prevention of mental ill health. There is still a very extensive story to tell about the effects of the war situation on the treatment of mental illness, the extensive deterioration that has occurred in our mental hospitals, the recrudescence of violent methods of handling patients by attendant personnel, the aid given by civilian public service and the techniques developed by imaginative superintendents to keep this deterioration at a minimum. There is a long story to tell about outpatient clinics; how they too have been at the same time crippled and loaded beyond their capacity of the best years. The story has been told and retold of the effects of evacuation and bombing on the children of our allies. There is much that we can learn from these episodes and from the fate of the rigidly indoctrinated children of enemy countries.

These are the many straws in the wind. They settle down variously. For some they are titilation to action. For others they become the last straws contributing to breakdown and with others they become irritants, the results of which will appear in the years to come. Many of these things we will never be able to identify in the changes in statistics of the decades ahead, but as experiments in human adjustment they warrant study. They are grist for the mill of progress.

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Narcolepsy in Negroes

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Introduction

Narcolepsy is generally regarded as a rare disorder. Though many articles on the subject have appeared in the literature in recent years, there are still many well-trained physicians who are unaware of its existence. It has been defined in various ways, but there is general agreement that the disorder is characterized chiefly by attacks of involuntary sleep. Though the attacks occur more frequently under conditions which favor normal sleep, they may also occur at any time and in the midst of ordinary activity. A second phenomenon which is often seen in narcoleptics is that of cataplexy, in which the victim during emotional displays, particularly laughing, loses muscle tone throughout the body and collapses.

It is well recognized that narcolepsy, like epilepsy, is not a disease, but a symptom. Its causes may be divided into three groups:

1) Organic disease of the hypothalamus or neighboring structures. The most frequent conditions seen in this group are pituitary tumor, and localized hypothalamic lesions due to encephalitis, trauma, or lues.

2) Endocrine dyscrasia. This is a presumptive explanation used in cases associated with obesity, alterations in metabolism and other symptoms suggestive of endocrine abnormality.

3) Idiopathic. As in epilepsy, our present state of knowledge results in most cases being placed in this group.

Even the briefest introductory review of narcolepsy would not be complete without mention of the almost specific value of benzedrin sulfate in its treatment. This drug, first introduced by Prinzmetal[1] for narcolepsy, and by Prinzmetal and the author[2] in post-encephalitic Parkinsonism, has shown remarkable value in producing wakefulness and other evidence of stimulation of central nervous mechanisms.

The purpose of the present article is to record the unusually high incidence of narcolepsy in negroes as observed during the neuropsychiatric screening of colored recruits in the U. S. Marine Corps.

Method

The Neuropsychiatric Unit at Camp Lejeune, North Carolina, is organized and functions in much the same manner as the corresponding unit at the U. S. Naval Training Station, Newport, Rhode Island. The latter has been fully described in published works.[3] Briefly, the Unit consists of psychiatrists, psychologists, and psychiatric social workers. Each recruit is seen in individual psychiatric interview as part of the entrance examination on arrival at the base. Further psychiatric examination, psychometric study, social service investigation and other methods of evaluating the recruit are utilized as indicated in an attempt to weed out the neuropsychiatric unfit. The chief causes for rejection have been enuresis, feeblemindedness, epilepsy, personality disorder, and psychoneurosis. Less frequent causes have included a wide variety of neuropsychiatric conditions. Foremost among these latter for negro recruits at Camp Lejeune has been narcolepsy. Narcolepsy is, of course, incompatible with military fitness,[4] as witness the fact that the death penalty may be incurred for falling asleep on watch.

In the diagnosis of narcolepsy in the cases reported here, pains have been taken to rule out the possibilities of malingering and increased somnolence within normal limits. All cases were documented by statements from reliable witnesses regarding the occurrence of involuntary attacks of sleep since arrival at the base. In most instances, typical attacks were observed on the neuropsychiatric ward. In all instances, social service investigation verified the fact that narcoleptic attacks had occurred in the home community prior to entrance in the service.

Results

In a series of 10,000 consecutive colored recruits, 19 cases of narcolepsy were seen. In addition there were numerous recruits with increased diurnal somnolence, but without the abrupt involuntary nature of the attacks so characteristic of narcolepsy. The clinical features of the 19 narcoleptics follow:

Age—Varied from 16 (one recruit who falsified his birth certificate) to 34, with a mode of 22 and a mean of 23.

Geographical Source—Three cases each came from Louisiana, Virginia and Arkansas; two each from Mississippi, Oklahoma, and North Carolina; and one each from Florida, Texas, Maryland, and Indiana. It will be noted that all but one are from the South, and that 12 of the 19 are from the deep South. This represents a greater proportion from the South than the distribution of all entering recruits would justify. The South which is the source of 95 percent of the negro narcoleptics sends only 63 percent of the total negro recruits to Camp Lejeune. Similarly, the deep South is the source of 63 percent of the narcoleptics, but of only 40 percent of the total negro recruits. These differences are statistically significant.

Family History—There was a positive history of neuropsychiatric disorder in six cases. In three there was a family history of narcolepsy; in one in the father, in another in a sister, and in the third in a maternal uncle. In three, there was a family history of mental disease requiring institutionalization; the mother, a maternal aunt, and the paternal grandmother in respective instances. Thirteen cases had negative family histories.

Past Medical History—There was a positive past medical history in eight cases. Four had had gonorrhea. One of these also was suspected of having had syphilis one year before entry into the service. One case had a history of having a large head as a baby. This man also was badly gassed by chlorine a year before entry into the service. One case had a history of frequent "fits" in childhood. One had a history of severe measles associated with the loss of memory for a week, at the age of ten. Another had a fractured skull 6 years before the onset of his narcoleptic symptoms. The medical history was negative in eleven cases.

Symptomatology—All cases had involuntary attacks of diurnal sleep. The symptoms had existed since early childhood in all but three. One of these was 19 years old and had had symptoms for one year, with a completely negative family and medical history. Another, aged 22, had had symptoms since he was 16. The family and medical histories were negative. The third had had his narcoleptic symptoms only since his skull was fractured 6 years before, at the age of 19. Symptoms, therefore, began in all cases in the first and second decades.

The frequency of attacks varied, but most cases had from one to several attacks each day. Most attacks lasted a few minutes, but some were momentary, while others lasted up to an hour. Attacks occured in spite of adequate or even prolonged sleep at night. There was no disturbance of nocturnal sleep.

All had had attacks while at work. Seven had been discharged from several jobs because of being found asleep during working hours. One employer, in a defense plant, wrote that after they learned that the man in question had had these attacks since early childhood, they "made allowances for him," since he was an excellent worker otherwise. Several had had accidents because of their attacks. Three had had repeated car wrecks due to attacks while driving. One fell from a second story window when an attack occurred while he was washing the window. One walked into a cow while asleep. One frequently fell asleep "in the middle of a row" while plowing and had to be watched carefully. Another was caught just as he was about to fall off a dock having fallen asleep at work.

Social service histories from the home community frequently used interesting terminology in describing these men. Some examples are: "slobbered with sleep," "sleepy-headed," "sleeping sickness" (not encephalitis species), "Everyone calls him 'Sleepy.'" One was frequently aroused by having cold water thrown at him, or by having firecrackers set off under him. The

mother of one man, the one whose sister also was a narcoleptic, insisted the children "had a spell put on them when they were little." Many of these men were referred to as "lazy."

All cases had been witnessed in attacks since their arrival in the service. Many fell asleep standing in ranks, or while marching. Several dropped their rifles at such times. One hapless recruit dropped his rifle when he fell asleep during the colonel's inspection. One recruit had an attack during drill and walked off into a barbed wire fence. One fell asleep on bivouac and was left behind by his group. Several were seen to have attacks while eating, talking, or singing. A number complained of headaches following their attacks. One man who always reacted violently when awakened, was twice turned in for insubordination by his drill sergeant. His explanation was "I was fixin' to go to sleep and I didn't recognize him."

Cataplexy was conspicuous because of its virtual absence in these cases. Two cases had mild cataplectic attacks. One of these had had only a few such attacks two years before entering the service and none since then. The other had frequently become weak on hearty laughter, had dropped things from his hand at such times and had once or twice fallen to the ground. Neither of these men had experienced the true "Lachschlag," the abrupt and total collapse on sudden emotion. The seventeen other cases were completely devoid of cataplectic phenomena.

Neuropsychiatric Examination

The physical and neurological findings were essentially negative in all cases. One man was unable to converge his eyes properly. He had never attended school and psychometric tests showed that he had borderline intelligence. The intelligence of the other eighteen was well within normal limits. One of these also had never attended school, but the others had schooling ranging from four grades to twelve grades, with a mode of eight grades and a mean seven grades. Two men were considered to have psychopathic personality traits and one was also an enuretic. The other seventeen were psychiatrically normal on examination. There was no evidence of unusual obesity or of endocrine disorder.

Etiology—In only one instance did the cause of the narcolepsy seem clear—the one in which the symptoms followed after a fractured skull 6 years before entry in the service. In two other cases, a possible cause was indicated: In one, a post-encephalitic lesion could be hypothecated on the basis of the history of severe measles at age 10, associated with loss of memory for a week; in the second, the large head in childhood suggests internal hydrocephalus and other possible organic brain stem pathology. In three cases, the presence of narcolepsy in the family history brings up the question of a hereditary factor. One of these, however, was the one already mentioned in connection with possible post-measles encephalitis. In three subjects the question of neuropathic hereditary taint is raised by the presence of mental disease requiring institutional care in the family history. In twelve instances there was no clue whatever to the cause of the narcolepsy. The evaluation of this data in an attempt to classify the nineteen cases according to the three etiological groups mentioned in the introduction of this paper would result in one case being definitely in group one (being post-traumatic), two others possibly in group one, and sixteen definitely in group three as "idiopathic." There were none with obesity or symptoms suggestive of endocrine disorder.

Discussion

It is difficult to obtain an entirely comparable group of white men for the purpose of eliciting the incidence of narcolepsy. At the U. S. Naval Training Station, Newport, R. I.,* narcolepsy appeared once in a series of 63,421 white Naval recruits examined in a manner similar to that described in this paper for negro Marine recruits. This is a rate of 2 per 100,000. In a different series

* These figures are available through the courtesy of Lt. Comdr. Cecil L. Wittson, Senior Psychiatrist at the U. S. Naval Training Station, Newport, R. I., with whom the writer of this paper was privileged to be associated during part of the time in which the recruits referred to were examined.

of 100,775 Naval recruits at Newport, narcolepsy appeared 4 times, a rate of 4 per 100,000. In a series of 25,000 Naval seamen examined neuropsychiatrically at Newport as part of a pre-commissioning screening, narcolepsy was diagnosed but once, a rate of 4 per 100,000. In contrast to these figures, the series of 19 cases in 10,000 negro Marine recruits, as here reported, represents a rate of 190 per 100,000 or more than 60 times the combined Newport rates. This enormous difference can clearly not be explained by chance, or by whatever minor variations there may have been in examining the two groups. All the recruits, both white and negro, were largely inductees, and were screened in much the same manner, in fact, in part, by the same examiner. In a group of 12,000 white women Marine recruits screened neuropsychiatrically by the author, narcolepsy was not seen at all. The question presents itself: "What may be the cause of this difference."

The literature offers us little help. Gelineau[5] mentions that narcolepsy is a disease of temperate climates, but gives no statistics. Instances of narcolepsy have been reported in practically all races, but no statistical comparisons have been attempted. A clue is perhaps provided by the geographical distribution of the cases of narcolepsy. The South, and particularly the deep South, have contributed almost all our cases of narcolepsy, far more than their share of the total recruits studied would justify by chance alone. Why should the non-Southern negro be spared in regard to narcolepsy?

It may be considered that climate is responsible. It has been noted[6] that narcoleptics are prone to more frequent attacks in warm weather. But our patients continued to have attacks in cold weather also. Besides, white men in the same climate (many of the Newport groups were Southerners) are not similarly affected. A dietary factor could be alleged, but, again, the diet of many white Southerners is not materially different and does not produce narcolepsy. Furthermore, the negro narcoleptic patients showed no evidence of nutritional disorder or vitamin deficiency, nor did they improve in their narcoleptic symptoms on partaking a full diet after entering the Marine Corps.

In Daniel's authoritative review,[7] 52% of the cases of narcolepsy began to have symptoms before the age of 21; 70% before 26. In the group reported here, 16 cases, or 84%, began in early childhood, and the remaining 3, or 16%, began at the ages of 16, 18, and 19 years respectively. This data, taken by itself, tends toward the hypothesis of a constitutional or inborn predisposition toward narcolepsy. Similarly, Daniels mentions the rare instances in the literature where narcolepsy was found to coexist in more than one member of a family. Yet among the 19 negro narcoleptic cases only, 3 had a history of narcolepsy in other members of the family. This incidence also favors a constitutional hypothesis. In the literature, approximately one-third to one-half of all cases are considered to be caused by organic conditions such as encephalitis, trauma, syphilis, brain tumor, arteriosclerosis, and endocrine dyscrasia. In the negro narcoleptics, only one seemed clearly organic (fractured skull), 2 probably organic (? post-measles encephalitis, ? hydrocephalus), the remaining 16, or 84%, being presumably "idiopathic." Again the data favors a constitutional etiology in the negroes.

The chief difference in the character of the disorder in the negro narcoleptics from those reported in the literature is the comparative infrequency of cataplexy. Daniels reports cataplexy in 102 of 119 cases, an incidence of 86%. Among the negroes, cataplectic attacks occurred in only 2 of the 19 cases, or 11%, and in these the attacks were mild. In negro narcoleptics, the attacks of *sleep,* in themselves, characterize the disorder. Some authors have referred to narcolepsy without cataplexy as not "true" narcolepsy. Daniels discounts this view, pointing out that in many cases cataplexy may not begin until several years after attacks of involuntary sleep have taken place. It is now generally accepted that the diagnosis of narcolepsy rests primarily upon the involuntary or irresistible

nature of the sleep attacks. The cases reported here were all verified as subject to typical attacks.

A nice point arises as to what is "involuntary or irresistible." Obviously both the impelling force of the attack and the resistance of the host are involved. It may be argued that the volition or desire to resist sleep is lacking in some negroes. If they don't care much whether they fall asleep or not, less of the hypothetical cause of narcolepsy will have to be present to bring about an "involuntary" attack of sleep. This view would seem to have some merit and it may be that part of the problem of the increased incidence of narcolepsy in negroes may be elucidated by it.

Though explained in this way, narcolepsy is still narcolepsy. Negroes may have a reduced resistance to tuberculosis, but if they acquire the disease, it is still called tuberculosis. There seems no good reason why attacks of involuntary sleep should not be diagnosed narcolepsy regardless of the degree to which sleep is voluntarily resisted.

One further factor which may be of relevance in connection with narcolepsy in negroes concerns the nature of sleep itself. Whatever theory one favors in regard to the physiology of sleep, it seems clear that the question of the passage from the waking to the sleeping state is dependent on the balance between those factors which tend to promote sleep (fatigue, quiet, monotony, etc.), and those which favor wakefulenss (external or internal stimuli, excitement, discomfort, worry). It may be that in some negroes, this balance is permanently prejudiced toward the side of sleep because of an impoverished environment and resultant lack of interest in the outside world. The educational, cultural, and social position of the negro, particularly in the South in this country, may make sleep seem more attractive than Nature had intended. Surely, if there is truth in Pavlov's theory of the "generalized inhibitory process" of sleep, then the Southern negro, who may be looked upon as chronically inhibited by the white man, may be considered as constantly in a state of readiness for sleep.

Summary

In the neuropsychiatric screening of negro recruits for the U. S. Marine Corps at Camp Lejeune, North Carolina, 19 cases of narcolepsy were detected in a series of 10,000 recruits. This incidence is more than 60 times that of narcolepsy among white Naval recruits at the U. S. Naval Training Station, Newport, Rhode Island. Eighteen of the 19 cases came from the South, and 12 of these from the deep South. This represents a greater proportion from the South than the distribution of all entering recruits would justify.

There was a family history of narcolepsy in 3 cases. Sixteen of the group began to have symptoms in early childhood. Only one case seemed clearly organic, 2 probably organic, and 16 "idiopathic" in etiology. Cataplexy occurred in only 2 cases, but the symptomatology of the narcoleptic attacks was characteristic in all cases.

In considering the possible causes for the increased incidence of narcolepsy in negroes, climate and diet may be ruled out as not operating differentially against the negro. A study of the data suggests that the Southern negro may have a constitutional predisposition toward the development of narcolepsy, and that this predisposition may be related in some negroes to a faulty resistance toward sleep or increased readiness for sleep.

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AUTHOR'S NOTE—The views and opinions contained herein are those of the author and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

Nervous Disorders in the Armed Forces*

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In considering a subject such as indicated by this title it must be borne in mind that the armed forces comprise approximately thirteen million individuals who have been more or less abruptly dislocated from civilian life, thrown together and put through a prolonged course of training to fit them for the various branches of the service. The agencies concerned have striven through an intensive process of selection and screening to prevent the induction of those who it could be predicted would not survive training or would break down under combat conditions.

In spite of this elaborate weeding out it is fair to assume that the members of the armed forces constitute a cross section of the civilian population, representing the ordinary variations in constitution and the latent hereditary weaknesses that may be physical, mental or emotional. Thus the severity of physical training may bring out disorders of the central nervous system that had escaped detection on the induction line or during the classification period. Or there may appear those organic disturbances of the nervous system that wait until the third or fourth decades before making themselves manifest. Again the careless, unthinking methods of indoctrination officers may arouse such fear and sense of loneliness that a first-class anxiety state is developed in an individual who was otherwise only moderately susceptible. One may find among our soldiers and sailors all the organic diseases of the nervous system encountered in civil life, with few exceptions. Obviously all those afflicted with birth injuries are caught at the induction examination. The same is true of poliomyelitis and the more obvious forms of encephalitis that appeared before the eighteenth year. The dystrophies and the heredo-degenerations are also usually in evidence before this period.

Medical records of World War I reveal an imposing list of organic diseases found among those who did not even go overseas. It includes, in addition to the commoner ailments such as multiple sclerosis, myelitis, etc., cases of Friedriech's ataxia, the Marie form, myasthenia gravis, myotonia congenita and progressive muscular dystrophy. There must, however, have been a more rigorous selection of troops sent overseas, since, except for those lesions caused by infections or injury, there was only one spinal sclerosis, one progressive muscular atrophy, one hydrocephalus and one residual birth palsy which passed through Base 1 at Savenay, France. While these figures are not complete in detail because of the loss of clinical records between Savenay and Brest, these records from Vol. X Medical Department are fairly accurate.

In the present war there is more efficient pre-induction screening, more thorough classification and a long period of rigorous intensive training to cull the best fighting material we have at our command. Despite these elaborate precautions, organic disorders of the nervous system are constantly appearing. Every general hospital in this country has its quota of multiple sclerosis. Likewise brain tumors, both supra and infra tentorial; spinal cord tumors more rarely; multiple neurofibromatosis, and some of the long projection tract degenerations. Occasionally organic cases slip by due to concealment of hereditary factors, restriction of the disorder to less obvious parts, or dodging of severe prolonged training.

I have not encountered those forms of progressive muscular dystrophy that have an acute onset, a fairly rapid development and appear in the late twenties or the early thirties, but I have no doubt that somewhere in this vast armed camp there may be such cases. Curiously enough I have seen no instances of degenerative cord lesions described by Henneberg as funicular myelitis.

* Read at a meeting of the Institute of Medicine, Chicago, Illinois, November 1st, 1944.

One would hardly expect to see them among the young and vigorous, no matter how they may have been exposed to rain, mud, cold, insufficient food and lack of sleep. But the older, middle-aged men who have endured these hardships and suffered severe infections such as malaria, dengue, the dysenteries or acute jaundice, might well be subject to this type of disorder. It may possibly happen that some middle-aged officers or men who have had to endure the rigors of military life will develop this ailment later, since its mode of development is slow and insidious.

The convulsive disorders likewise crop up even though every selectee who reports previous seizures undergoes careful psychiatric social service investigation. Some selectees conceal the fact of their seizures, hoping that army life will cure them. Others may never have been aware of seizures; in fact may never have had one, and yet are unable to withstand the stress and strain of the strict regimentation, the crowded living conditions of army life or the horrors and strain of exhausting combat. Under such circumstances the real constitutional factors which they possess are brought to light and are expressed through convulsion. Sometimes the malingerer tries to feign a convulsion. With adequate experience it is easy to detect the sham. I know of nothing so difficult to simulate as a fit, although some writers, notably the French, have called attention to the difficulty of differentiating a true from a hysterical convulsion. I know of one instance where the boast was made that such a thing had occurred.

It was a young man whom I had examined when he was fifteen. He had had two or three convulsions at the age of nine following an infection. He was a wild, ungovernable youngster who would not conform to the ordinary social pattern. He was dismissed from several schools for misconduct or refusal to study. In 1940 at the age of 20, he joined the army and curiously enough adapted himself so well to military life that he advanced steadily and reached non-commissioned rank and became an instructor. He was stationed in Virginia and just as he was making good, word was whispered about that instructors were needed for Puerto Rico where it was said promotion was rapid. He volunteered and was transferred to that island. After a short while came disillusionment. He had practically nothing to do as there was a large surplus of non-coms but nobody to train. He became more and more resentful and disgruntled, became sick of army life and looked for a way out. He gave ear to a latrine rumor that if a "guy could fake a fit" he would be discharged. So he set about it and managed to fool everyone, according to his story. He had written a detailed report of everything that went on while he was supposed to be unconscious, and gave a graphic description of how hard it was to remain absolutely quiet when the supraorbital nerve was squeezed. At all events he got his discharge and then joined the merchant marine. After having his ship torpedoed in the Caribbean and survived seventeen days in the life boat without food or water, and watching his mates succumb, he decided that once more he could take it. He was on his way to Washington for a hearing to confess his crime and ask for whatever punishment the army would give him. He came to me to discuss the value of an electroencephalogram as a diagnostic procedure, and whether a negative finding might corroborate his statement. Whether or not he was discouraged by my attitude I do not know, but he did not keep his appointment for the test and I have heard nothing from him since.

I have not seen in any of the Army or Navy general hospitals that I have visited, cases of progressive muscular atrophy or the acute forms of amyotrophic lateral sclerosis, but I have no doubt that they will be found or else show up later on in the Veterans Administration Facilities.

In addition to the virus born infections mentioned above, there is the usual number of cases of infections of the nervous system due to bacterial causes. Thanks to the remarkable effects of sulfa and penicillin therapy, the meningitides with a few exceptions are no longer considered hopeless. It may well be however that through the prompt and effective use of the drugs in early cases

of meningeal infections, that virus combinations with bacteria, may be disclosed, and while the bacterial infection may be quickly overcome, the virus infection will persist. I believe that I encountered such a case recently. A boy of eleven presented the picture of an acute meningococcis meningitis; meningococci were recovered from the throat, the blood and the spinal fluid. After a few days' saturation with sulfadiazene and penicillin, the meningococci disappeared from blood, spinal fluid and throat, the acute meningeal signs disappeared but a typical Guillain-Barre syndrome remained.

Happily the improved precautionary and prophylactic measures in force today have practically eliminated those dreadful epidemics of measles with secondary meningeal infections or abscess formation, seen in the last war. Thanks to the sulfa drugs and penicillin the frequency of mastoiditis with its crippling sequelae has also been greatly reduced.

Confirming the impressions just given, a colleague stationed at a large general hospital wrote: "A review of the cases on my service indicates that the great majority are idiopathic epilepsies and peripheral neuritis, secondary to injury. Of the epilepsies 4 of them are symptomatic—2 secondary to brain tumor and 2 secondary to injuries of the brain. In addition we have about 5 cases of sciatic syndrome, 2 of these secondary to a herniated disc. We have 3 cases of poliomyelitis; 1 case of hypertensive encephalopathy; 2 cases of multiple sclerosis; 2 cases of peripheral neuritis, etiology unknown; 2 migraines; about 10 cases of traumatic encephalopathy; 1 trigeminal neuralgia; 1 paralysis agitans; 1 pseudobulbar palsy; 2 Meniere's; 2 cauda equina lesions, 1 secondary to injury and the other probably secondary to a giant neoplasm. In the past we have had several cases of subarachnoid hemorrhages due to rupture of aneurysms at the circle of Willis, and a number of myeloradiculitis cases."

As one would suspect luetic infections of the nervous system still constitute a serious problem in the conservation of man power. Thanks to better prophylactic instruction by lectures, moving picture films and confidential advice to soldiers, and the use of whatever prophylactic precautions public policy permits, the incidence of lues in the armed forces today is much less than in the last war. There is, however, a sufficient number of cases of neuro-syphilis in the army to warrant establishment of centers for treatment. The types of cases do not differ from those seen in civilian practice, and I am told as usual there is the same scarcity of pure tabetic types on encounters outside the Army. This is of some possible significance since it does not agree with Ewald's observation made at the time he was in the Austrian army. He attributed the high rate of tabes to the fatigue caused by long, forced marches which reduced the resistance of the spinal system and allowed the luetic process to become active.

The greatest number of organic lesions of the central nervous system and peripheral nerves is obviously due to battle casualties, resulting from explosion, fire, shell fragment or bullet. I have been impressed with the great foresight of the Surgeons General of both Army and Navy in the creation of centers for combined neurological and neuro-surgical services, and the formation of teams composed of neuro-surgeons, neurologists and neuro-psychiatrists. These centers also have proficient internists, orthopedic surgeons and in some instances, plastic surgeons. In this way the individual is studied as a total personality and not merely treated through the limited vision of each specialty. It was my privilege to see the work of these teams in both Army and Navy hospitals last summer, and I was greatly impressed by the advances made since the last war.

The study of causalgia for instance, has been greatly intensified and is receiving close attention. This subject since Weir Mitchell has always been of great interest. Its causes are still as mysterious as ever and the source of constant speculation. We still do not know the exact pathways over which these pain impulses travel, neither have we completely established the respective roles of the sympathetic fibres, the parasympathetic fibres, the vascular net-work and the anterior roots in this mechanism.

Pollock and Davis in their monograph on peripheral nerve injuries, state that the pathogenesis of causalgia and its pathology are still unknown. W. K. Livingston says, in discussing the variability of success from novocaine injections of sensitive points in low back pains: "I am inclined to believe that in cases that do not respond favorably to injection therapy, and which may represent more extensive organic involvement, the irritation of sensory nerve filaments and the secondary reflex mechanism which results from the persistent irritation, play an important role in the development of the low back syndrome. Perhaps the situation is not dissimilar to that when nerve trunks are cut, crushed or compressed. In many instances such injuries to nerves do not set up a causalgic state, and are attended by no unusual degree of pain or disability, yet, under conditions that are not clear, an exactly similar nerve lesion may cause severe pain and start the spreading reflex disturbance recognized as causalgia."

As an example in civilian practice consider this case: A middle-aged woman had a metastasis within the skull near the right jugular foramen, involving the ninth, tenth, eleventh and twelfth nerves on that side. Her chief complaint was constant, excruciating pain in and around the right eye. During an attempt to dissect out this mass for relief of pain, it became necessary to excise the right vertebral artery running through the mass. The instant the clamp was applied she cried out "there is the pain in my eye." Through what pathways did those pain impulses run? One more example: The case of a woman in her early sixties who for years had had intractable pain in her rectum following an extensive bruising of the coccyx. After all local operative measures had failed to relieve her, a bilateral chordotomy in the upper thoracic levels was done and the saddle area alone picked out with complete anesthesia. There was, however, no relief of her rectal pain.

A certain amount of pioneer work has already been accomplished in this field, such as injection of trigger zones arising in scar tissues, including injured nerves or injured fascia, injection of various hypersensitive areas in the back for either high or low back pain, and by the meticulous dissection of the para-sympathetic connections of the gasserian ganglion for the relief of those trigeminal neuralgias that do not respond to root section alone.

The medical departments of the armed forces have a magnificent opportunity, through the harmonious cooperation of these medical and surgical teams, to their understanding of the importance of team play and through the wise selection of its members.

The psychosomatic point of view deserves mention here. Simply put it implies the approach to an understanding of a man's disease through the total personality of the individual, a point of view expressed long ago by many profound thinkers in medicine and psychology. This attitude is gaining strength and expansion throughout all branches of medicine and surgery. Army medical chiefs are keenly aware of the importance of this point of view.

In many general hospitals, consultation reports alone do not suffice. The internist, the surgeon and the orthopedist often collaborate in the study of their cases. An instance will demonstrate the point. At a nearby hospital an internist discovered an essential hypertension in a soldier who had been diagnosed as a psychoneurotic. What will the result be? Why, of course the internist and the psychiatrist will get together and learn whether the hypertension is really the expression of psychological turmoil or some organic cause. In like manner, if a good, keen internist is on hand, convulsions due to hypoglycaemia will not pass undetected.

Circulatory disturbances, ulcer syndrome and other gastro-intestinal disorders, diarrhoeas, etc., are now being studied intensively by teams with this approach. The proper incentive for these teams is important. The conservation of manpower, either for the armed forces or for production in industry, becomes their objective. Certain cutaneous disorders also are in this category. If not improved and the disorder is severe enough to interfere with efficiency,

the man is considered unfit for military service.

I have left the psychoneuroses for the last. It is interesting to note that the term neurosis or neurotic has grown in ill favor and disrepute, just as the term shellshock did in the last war. The reaction has developed to such proportions that this designation no longer appears on discharges. There can be no doubt about the seriousness of this disorder. It is estimated that it constitutes at least one third of the total casualties. In a recent communication the Director of the Veterans Administration announced that on the basis of care used in the last and earlier wars, the organization expects to care for approximately 80,000 cases, of which only 20%, a little over 16,000 will be rated as service connected. The remaining 80% will have to depend upon other agencies for vocational training and medical care.

The impression is wide-spread that no new types of this disorder have appeared since the last war. Perhaps through a more intensive study, particularly in civilian life, we have come to a better understanding, not so much of the clinical features as the variations in personality of the individuals suffering from these disorders. The real advance because of this better understanding, has come in treatment, in the handling of the individual rather than the symptom. As a result, we find encouraging reports of the return to duty from the neuro-psychiatric wards of most general hospitals of seventy percent or over.

However a serious question confronts us in this connection: How successfully do these returned soldiers stick? Probably this question must wait until after the war for satisfactory analysis. How well does the soldier adapt himself to the old environment of close regimentation, severe discipline, exhausting training away from his hospital companions, the beneficent influence and sympathetic understanding of doctor and nurses, and the absence from those he called buddy at the time he broke? My understanding is that the end result is not too gratifying and that there is the same disappointing experience of the last war. Then we took great pride in returning about 10% of neuropsychiatric casualties to duty from the field hospitals, but we have no accurate data concerning how many stuck or how many drifted back worse off than before.

One of the important developments in military therapy of these cases, which came from civilian practice, is group psychotherapy. It is proving of great value, particularly in the Navy, where it has been given greater utilization. It is indispensable to the success of this procedure that there be careful selection of the patient who can and has the will to profit by it. Here, as elsewhere, everything depends upon the intelligence, sympathtic understanding and the keenness of the officer in charge. He must be able to imbue his patients with the confidence that he does understand their problems and that their welfare is his chief concern. Having accomplished this, his next step is to rebuild their morale and recreate their incentivation. I have been particularly impressed with the work of one young Navy doctor who not only treats his cases intensively but makes them aware that it is for a definite period, at the end of which they must be returned to duty in some capacity or else be discharged. However, he does not stop there for he provides contact for the dischargee with a representative of the Federal Vocational Bureau. Thus the discharged man is not simply turned loose and told to go look for a job. He is immediately taken over by a qualified government agency.

There is also a healthier and more pragmatic view developing about the use of the diagnosis than formerly. Many physicians are of the opinion that a definite proportion of this group display neurotic signs merely because they are absolutely unfit and unable to adapt themselves to military service in any capacity. As soon as discharged they should be able to return to civilian occupation as successfully as before. The question also has far-reaching economic implications since if they are discharged as unfit for military service there can be no claim of service-connected disease and hence no compensation.

Involutional Psychoses Treated With Shock Therapy*

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For the past seven years we have been treating the involutional psychoses with the various forms of shock therapy. After experimenting with insulin, metrazol, electric and combination of insulin and metrazol or electric, we have come to the conclusion that the method giving the best results is a combination of insulin and electric shock, or insulin with metrazol.

Up until June 30, 1943, we completed 112 cases. Of these, 79 (70.5%) are adjusting in the community, 30 (26.7%) are in the hospital, 10 (8.9%) of whom are returned cases, and 3 (2.6%) died under treatment.

Our usual method of treatment of the depressed, agitated type is to begin insulin and electric shock concurrently and to produce as deep a coma with insulin as the patient's physical condition will permit. In the paranoid type we usually begin with insulin and add the electric if they have not improved after twenty insulin treatments. A most important factor in the use of shock therapy, other than increase in remission, is the rapidity with which the patients who do recover are able to leave the hospital. Of the 79 patients in the community, 30 left the hospital in less than three months after admission, 28 others in less than six months, 12 between six and nine months, five between nine and twelve months, and the remaining 4 had been here for over a year. The shortening of the period of hospitalization is most important in the male involutional who frequently is holding a fairly responsible position, which he may not regain if hospitalized for a prolonged period. But if he recovers in less than six months, he can frequently resume his previous occupation.

The direct effect of shock therapy can be evaluated by a comparison between involutional cases admitted during the years 1934-35, before shock therapy was instituted, and 1939-40, when 63% of the involutinals admitted were given shock treatment.

The following table reflects this comparison and shows their status two years after admission to the hospital:

	Total	In Community	In Hospital	Died
1934-1935 Total				
Involutional Cases				
No Shock Therapy	40	12 (30%)	18 (45%)	10 (25%)
1939-1940 Total				
Involutional Cases	79	44 (55.6%)	24 (30.3%)	11 (13.9%)
Treated with Shock Therapy	50	34 (68%)	11 (22%)	5 (10%)*
No Shock Therapy	29	10 (34.5%)	13 (44.8%)	6 (20.7%)

*Of these 1 died under treatment; in the other cases it was necessary to discontinue treatment because of physical factors which, in all 4 cases, were due to cardiac complications.

The patients not treated with shock therapy during the 1939-40 period were principally those with cardiac pathology. This condition is no longer considered a contra-indication, as we have successfully treated several cases where there was electrocardiographic evidence of coronary diseases. Other cases were not treated because of pulmonary pathology or refusal of permission. It is to be noted that the percentage of deaths has been cut approximately in half. This is attributed to the prevention of exhaustion in the depressed agitated cases by the rapidity with which they respond to electric shock treatment. We have tried several cases on metrazol or electric shock alone and, while the improvement is rapid and spectacular, in our experience it is not sustained and by using insulin, in conjunction with metrazol or electric shock, a more permanent result is obtained. No endocrine products were

*From the New Jersey State Hospital, Trenton, N. J.

given to the patients treated with shock therapy but in the 1934-35 group they were used extensively.

Conclusions: (1) A higher percentage of involutional psychotics can be restored to a pre-psychotic functioning level by the use of shock therapy. (2) Patients can be returned to the community in a much shorter period, which enables them to resume their previous occupations and duties. (3) The death rate reduced one-half by preventing exhaustion in the depressed agitated types.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., Editor

CASE NO. 137542

Presentation

A 67 year old white woman was admitted to the Neurological Service on January 31. She was said to have known of her hypertension for 15 years, and had to arise two or three times a night to urinate for several years. She had been in excellent health up to one week before admission to the hospital when frequent and generalized headache began. On January 28 the pain was worse in the vertex, otherwise she seemed normal. She went to bed that evening with the headache. About 9 A.M. on January 29 her husband awoke to find her lying on the floor trying to arise. He helped her up and she said that she had arisen shortly before to go to the bathroom and had become dizzy and fallen. He assisted her to the bathroom and back to bed where she lapsed into coma within 30 minutes. She was seen by the family physician who found the blood pressure to be 230/110; he elicited a left Babinski.

She was removed to another hospital where it was said that she had diabetic coma. The blood sugar on admission there was 400 mgm. per cent, and the urine contained sugar and acetone. She was given fluids parenterally and about 100 units of insulin during two days. The urine cleared of sugar and the blood sugar fell to 197 mgm. per cent. Five hundred cc. of blood were removed "to lower the blood pressure." She was transferred to the Cincinnati General Hospital because she became noisy during momentary arousals from stupor.

The initial examination here revealed the following abnormalities. She was obese. She appeared to be sleeping but would arouse when disturbed and deliriously resist and shout. The pupils were small and reacted fairly well to light. The vessels of the retina showed sclerotic changes. The resistance of the extremities to passive movement was increased on the left. She removed the right lower extremity from pinprick more promptly than the left. A weak left Hoffmann response was elicitable.

She would take fluids. She became less resistant and quiet, and on February 2 was talking rationally. She complained of headache first in the vertex and later in the occiput. On February 2 she fell on getting out of bed to go to the bathroom. She was gradually got out of bed, first in a chair. On February 13 the right abdominal reflexes were more active than the left. The pupils were normal. She was still drowsy and yawned considerably. On February 11 she complained of persistent drowsiness. By February 17 the headache had disappeared completely. She became increasingly alert and stronger, and was discharged on February 23 walking.

Her temperature, pulse rate, respirations, and blood pressure were always normal in this hospital. Daily urinalyses were done. There was a trace of albumin in the urine on the first, second, and sixth days in the Cincinnati General Hospital. Sugar and acetone were found on the second, third, and fourth hospital days. Blood counts showed

a W.B.C. of 16,800, polymorphonuclear leukocytes 83%, R.B.C. 3.95 million, and hemoglobin 12.8 grams. The blood Kahn was negative. Fasting blood chemistry was determined as follows:

	1/31	2/3	2/5	2/10	2/14	2/15
Urea N. mg.%	59	16	15	13	13	
Sugar mg.%	267	155	152	137	126	138
CO2 C.P. vol.%	44	61	58	63	65	

On February 15 a glucose tolerance test was done; 100 grams of glucose were administered by mouth. The fasting blood sugar was 138 mg.%, after ½ hour 260 mg.%, after 1 hour 364 mg.%, after 1½ hours 408 mg.%, after 2 hours 404 mg.%, and after 3 hours 286 mg.%. All specimens of urine collected during this test were normal, except that passed 5 hours after the glucose administration, which gave a heavy qualitative test for sugar.

Three cerebrospinal fluid analyses were performed (January 31, February 3 and 14). The initial pressures were respectively 190, 140, and 100 mm. of water. The fluid of January 31 was bloody, containing 7500 RBC and 20 WBC per cmm., and 60 mg.% protein. After centrifuging the cerebrospinal fluid, the supernatant fluid was markedly xanthochromic. That of February 3 was xanthochromic, containing 380 RBC and 6 lymphocytes per cmm., and 39 mg.% protein. The final fluid was xanthochromic, and contained 10 RBC and 5 lymphocytes per cmm., and 50 mg.% protein. Three colloidal gold curves were normal, and three CSF Wassermann tests negative.

The patient was not seen again until her second admission to the Neurological Service, two years and ten months after leaving it. She then lived for 66 hours.

She was 70 years of age. She had been entirely well and without medical supervision since her discharge from the hospital, caring for her home efficiently.

For 5 to 6 weeks before entry she had had pain on the top of the head every two or three days. The night before admission she arose from sleep to go to the bathroom to vomit; she brought up a small amount of material. She complained of vertigo and almost fell, and required assistance to get back to bed. There was no local weakness and she was quite clear mentally. She was restless during the remainder of the night and did not eat breakfast. During the day of entry to the hospital she fell out of bed twice. Her speech became slurred, thick, and slow. She developed increasing drowsiness over the day and breathing became stertorous. She entered the Cincinnati General Hospital early on the morning of December 3.

She was drowsy and mumbled unintelligibly when first examined, her speech sounded as though the mouth were full. The eyes rested in left conjugate deviation, where spontaneous, rapid, horizontal nystagmus was observed. The corneal reflexes were reduced. The pupils reacted slightly to light. All the extremities showed increased resistance to passive movement, there did not appear to be any local weakness, the deep reflexes were hyperactive and the plantar responses extensor. Bilateral Hoffmann responses were obtained. The abdominal reflexes were absent. The heart was enlarged to the left. The peripheral vessels were sclerotic.

She gradually lapsed into a restless snoring coma; breathing was of the Cheyne-Stokes type. Her deep reflexes disappeared. She died on December 5.

On the second admission the rectal temperature ranged around 101° F., the pulse rate about 110, the respirations gradually rose to 50 per minute, the RBC was 4.6 million, the hemoglobin 14.5 grams, the WBC 14,750 with 77% neutrophils. There was sugar in daily urine specimens. The blood sugar was 339 mg.%, the CO2 C.P. 58 vol.%, the urea nitrogen 33 mg.%. A lumbar puncture done on admission revealed an initial pressure of 180 mm. of water and the final pressure was 100 mm. after the removal of 10 cc. The CSF was turbid pink and after centrifugation was xanthochromic. There were 4,794 RBC and 68 WBC per cmm., 13 of the latter were polymorphonuclear leukocytes. The total protein of the CSF was 330 mg.%, the sugar 165, and the chlorides 707. Gold curve and Wassermann were normal. A cisternal tap done just after death released opalescent, deeply xanthochromic CSF, containing "numerous" red blood cells.

The blood pressure on successive days was 130/100, 118/70, 128/56.

Differential Diagnosis

Dr. George L. Engel: The differential diagnosis concerns two episodes of subarachnoid bleeding in an elderly woman with diabetes and varying hypertension. The subarachnoid bleeding is symptomatic and the clinical picture is not explained by subarachnoid bleeding alone. From the cerebrospinal fluid on two admissions it is obvious that subarachnoid bleeding is not massive and could not account for the clinical picture. The patient had two episodes separated by three years and in the intervening period she enjoyed good health. One might profitably analyze each instance by itself.

At the time of the patient's admission to the hospital she had diabetes; the clinical and laboratory data establish this diagnosis. If she had diabetes preceding this it must have been rather mild, since she had no clinical signs of it. On the first admission to the hospital I think one must also assume that her diabetes was out of control. At this time she still had acetone in the urine, and her CO2 combining power was 44. This suggests that she must have been in a greater degree of acidosis on her admission to the other hospital, where she was given 100 units of insulin and fluids. This, however, does not explain her disturbance of consciousness. Generally the patient is greatly improved by the time her CO2 combining power is restored to that level.

Whether this is a diabetic patient who developed this catastrophe or whether the diabetes is related to her neurological syndrome, I do not know, and I must say that I am influenced in thinking about the latter because I was assigned this case. However, with the information at hand it would be very unwise not only to assume that diabetes had been absent before the stroke but also to attempt to ascribe some localizing value to that finding. For that reason I shall assume the patient had mild diabetes to begin with. Her subsequent lack of diabetic symptoms in spite of a diabetic sugar curve and no treatment could hardly permit one to say that such was not the case. The absence of symptoms might be explained by the high renal threshold for glucose.

In analyzing the neurological symptoms one is impressed by the rather sudden onset. She enjoyed excellent health up to one week before admission, when she developed generalized headache, and the day of admission became dizzy, fell, and shortly lapsed into coma.

The examination was not particularly helpful as far as discrete localization other than to suggest a lesion on the right side. She had evidence of left hemiparesis, and increased deep reflexes on the left.

The cerebrospinal fluid, of which there are three examinations, suggests subarachnoid bleeding. The subarachnoid bleeding was not extensive and in a rather short period cleared.

The question comes up of where one might localize this lesion. My first feeling is that the lesion is located in a silent region of the right cortex, probably right frontal. I was influenced because the changes in consciousness are rather marked. The left sided weakness was minimal, and there was rather complete recovery of function, indicating that the motor fibers were involved in edema rather than by a destructive process.

There is repeated emphasis on the patient being drowsy. On February 11 she complained of persisting drowsiness. This lasted several weeks. If that were not emphasized as much as it is, I would think little of it because I believe most elderly patients who suffer cerebral accidents are likely to be described as drowsy when actually they are delirious. The question is whether this is a pathological sleep disturbance or the usual drowsiness seen in elderly patients recovering from delirium. I think I might come back to the localizing value of this point.

I think in localizing the lesion of the second admission one thinks first of the posterior fossa and again the cerebrospinal fluid reveals unquestionable evidences of subarachnoid bleeding. In this instance I think one can say the diabetes did not play any direct role. No evidence of acidosis is present. The first thought I had in reading the clinical description would be to link it

with the earlier history, and to suggest hemorrhage into the ventricular system.

On reading over the protocol more carefully there are many reasons for not accepting that diagnosis. One is the more or less gradual onset of symptoms, the second is the cerebrospinal fluid pressure. The pressure is always tremendous with intraventricular bleeding. For these reasons I abandoned the idea of bleeding into the ventricles, and looked for a disturbance in the brain stem; and when one goes over the data one may localize this lesion somewhere in the brain stem region. The initial symptoms of headache and vertigo would suggest disturbance in the vestibular system. Conjugate deviation of eyes could arise from a hemispheral lesion, but with nystagmus developing suddenly I believe one has to think of a brain stem lesion. Bilateral pyramidal tract signs, the change from spasticity to flaccidity, bulbar speech, the more or less fixed pupils also must localize the disturbance to the brain stem, where the motor fibers from both sides may be most readily implicated. The lesion may be laterally placed on the left side because of deviation to the left and nystagmus to the left.

At this point to recapitulate, I feel we are dealing with two lesions, that which resulted in the first admission, in the frontal area on the right side, and the later, located in the brain stem veering somewhat more to the left than to the right.

An important question is the etiology of the two lesions. I think one can rather quickly eliminate many etiological factors. The only important considerations are tumor or tumors and some type of primary vascular lesion such as hemorrhage or thrombosis, perhaps related to arteriosclerosis or aneurysm. I think the diagnosis of tumor can be discarded because of the three year history during which the patient was without symptoms. In such a restricted area as the brain stem, it seems to me that a neoplasm could hardly go on for three years without showing symptoms. That leaves me with a vascular etiology.

It is obvious that the patient did not have simple subarachnoid bleeding, but involvement of brain tissue as well. The question comes up whether she had intracerebral hemorrhage. In the first episode, the clinical picture does suggest intracerebral hemorrhage which leaked into the subarachnoid space, with edema surrounding it, and with the zone of residual destruction being rather small.

In the second episode I was impressed with two things. One was the fact that the symptoms developed rather slowly, that is, slowly for this area. If this patient had had hemorrhage into the substance of the brain stem, it would have been more rapid. The symptoms are more characteristic of those seen in thrombosis of a brain stem artery. On the other hand we have obvious evidence of subarachnoid bleeding. There also is a protein of 330 mg.% in the cerebrospinal fluid. That raised the question in my mind whether she had not been bleeding slightly over a period of days before evidence of the final catastrophe became obvious. That might explain the headache that went on for weeks before she had the last and fatal episode.

My interpretation of the last episode would be that the patient had a primary vascular lesion of the basilar artery or that this lesion leaked slowly into the subarachnoid space over a period of time, which became adherent to the brain stem, thus preventing massive subarachnoid bleeding. This was followed by thrombosis distal to the leaking area with progressive infarction of the pons and the portions of the brain stem giving this clinical picture and leading to death. With this interpretation, I would say there were two lesions, (1) the old lesion in the right frontal area, and (2) this lesion in the pons I have just described.

Was the primary vascular lesion aneurysm or arteriosclerosis? I don't know of any way of differentiating, but on the basis of statistics, it is quite unlikely she would have an aneurysm persisting without symptoms to the age of 67 years, so I would say this is arteriosclerosis.

There is only one other thing that comes up in my mind. Would it still be possible to have a small hemorrhage located in the hypothalamus on the first episode, somewhere near the third ventricle, and on the second

admission further extension of this process? I mention this because of the drowsiness on the first admission, so much emphasized in the protocol, suggesting a hypothalamic lesion. This did not occur to me until just now and frankly I have not reviewed the anatomical relationships in this area, so I am not able to speculate on this point any further.

Dr. Milton Rosenbaum: I think that this was pathological drowsiness.

Dr. Charles D. Aring: I agree. At the first admission this patient was quite knocked out, and she had a paucity of neurological signs, the demonstration of which required expert examination.

Dr. Howard D. McIntyre: The nystagmus here could be of some help in localization. There is evidence that nystagmus may be caused by irritative lesions of the cerebral cortex. In an unconscious patient one should not have irritative cortical nystagmus since the patient must be aware to correct the position of the eyes—which constitutes one phase of the nystagmus. I would doubt that this nystagmus was arising from the cerebral hemisphere.

Doctor Aring: It seems to me that nystagmus of the severity and type described here is almost without exception an indication of dysfunction of the vestibular mechanism. We look upon spontaneous nystagmus as an indication of involvement of the cerebellum, or of the vestibular nuclei, or of connections between the two.

Dr. I. Mark Scheinker: How much evidence is there for the concept of central diabetes?

Doctor Engel: The answer to this problem as yet eludes us. It has recently been reviewed by Long.[1] It is well known that puncture of various portions of the central nervous system, notably the floors of the third and fourth ventricles, may lead to hyperglycemia. Hyperglycemia, however, is not diabetes, and even in those instances in animals in which a diabetic picture has been produced, it has always been transient. It should be emphasized that hyperglycemia and glycosuria may result both from disturbances in the insulin secreting mechanism and from stimulation of the sympathico-adrenal medullary system, the latter mobilizing glucose from the liver. The hyperglycemia produced by puncture of the floor of the fourth ventricle may well result from the latter mechanism. If the production of permanent diabetes by extracts of the anterior pituitary proves to be a valid mechanism, the possibility of a direct connection between the hypothalamus and pituitary in this regard must still be considered. So far there are no convincing or reliable metabolic studies of carbohydrate metabolism in experimental central nervous system lesions which would allow anyone to state unequivocally that true diabetes mellitus can result from a brain lesion; nor has the possibility been excluded.

Dr. Eugene B. Ferris: This patient reminds me of one with subclinical diabetes who is thrown in acute diabetes as the result of non-specific disturbance, such as happens with infection for example.

Clinical Diagnosis

First Admission:
- Small cerebral hemorrhage, right hypothalamus
- Diabetes mellitus
- Generalized arteriosclerosis

Second Admission:
- Cerebral hemorrhage, probably brain stem
- Diabetes mellitus
- Generalized arteriosclerosis.

Doctor Engel's Diagnosis

Two episodes of cerebral hemorrhage (1) right frontal, (2) pontine.
- Diabetes mellitus.
- Cerebral arteriosclerosis.

Anatomical Diagnosis

Bilateral thalamic softening (old hemorrhage).

Atrophy of the nuclei of the hypothalamus.

Cerebellar hemorrhage, right, with edema of the right pontine brachium and the brain stem at the pontine level.

Generalized sclerosis of large and small arteries.

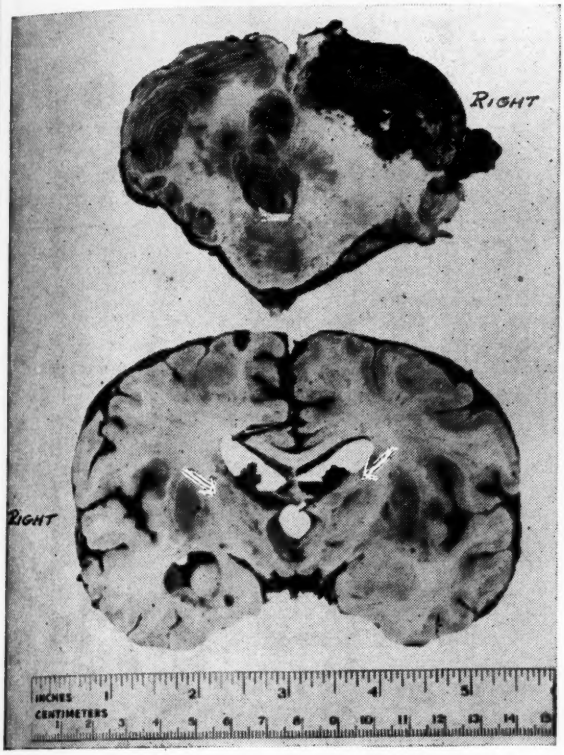
Atrophy of the adrenal glands.

Cirrhosis and fatty infiltration of liver.

Lobular pneumonia, left lower.

Discussion of Pathology

Dr. I. Mark Scheinker: On gross examination of the brain there was swelling; the gyri were flattened. The right cerebellar hemisphere was markedly swollen and soft to touch; the leptomeninges overlying the right cerebellar hemisphere contained a hemorrhagic discoloration.



Photograph of two gross sections of the brain (1) through the dentate nucleus, to illustrate the hemorrhage in the right cerebellar hemisphere and the consecutive edema of the brachium and pons; and (2) through the third ventricle.

In the latter note (a) dilatation of third ventricle, (b) atrophy of the mamillary bodies, (c) stripe of softening in left medial thalamic nucleus —► (d) destruction of the right anterior thalamic nucleus by a lesion just inferior to the ependyma of the right lateral ventricle —► and (e) attenuation of the thalamic complex.

On coronal section through the hemispheres one found that the dorsal portion of the right thalamus was partially destroyed by an old process which involved the anterior thalamic nucleus. A stripe of golden-yellow discoloration lay subependymally, beneath the floor of the right ventricle. On the left, just beneath the anterior thalamic nucleus there was an old linear cystic softening. There had occurred considerable loss of bulk of the thalami bilaterally. The third ventricle was tremendously dilated, the dilatation was greater on the right than on the left. This was apparently associated with a generalized atrophy of the hypothalamus bilaterally. The mamillary bodies appeared attenuated. These changes may be observed in the photograph (Figure 1).

The posterior third of the right cerebellar hemisphere contained a large area of massive hemorrhage involving the postero-superior extent of the cerebellar cortex. The adjacent white matter of the right cerebellum showed striking swelling, with resultant shift of the midline of the vermis from the right to the left. The right brachium pontis as well as the right half of the pons appeared considerably swollen as compared with the left (Figure 1). The fourth ventricle was compressed.

The microscopic examination of sections taken from softened areas of the thalami disclosed findings typical of old hemorrhage.

In the hypothalamic paraventricular nuclei the nerve cells were decreased in number and revealed changes characteristic of sclerotic atrophy. There was a moderate degree of glial reaction. The atrophic changes in the medial mamillary nuclei were very striking. Only a few cells were normal, the rest showed far advanced atrophy and fatty degeneration. Similar changes could be seen in the subthalamic nucleus on both sides. Many cells showed fatty degeneration and neuronophagia. The supraoptic nuclei appeared relatively well preserved; the nerve cells showed a slight degree of chromatolysis.

Sections taken from the cerebellum revealed the presence of numerous perivenous hemorrhages in areas adjacent to the massive hemorrhage. The white matter disclosed characteristic histologic signs of a far advanced edema.

The pancreas was normal. The adrenals showed diffuse atrophy; focal areas of cell necrosis were found chiefly in the cortex. The findings in the liver were characteristic of a high degree of cirrhosis; in addition there was a moderate degree of fatty infiltration. In sections taken from the pitui-

tary gland, no abnormalities could be detected.

Doctor Engel: In the first place, absence of changes in the pancreas is the rule rather than the exception in diabetes mellitus, so we still cannot say that the patient did not have diabetes before the first episode. Indeed, what evidence there is indicates that she did.

I think the most reasonable interpretation is that the hypothalamic lesion disrupted her previous narrow margin of control, throwing her into diabetic acidosis for the first and only time. This is consistent with what we know of the transient nature of the carbohydrate disturbance with hypothalamic lesions. I think the fact that this patient presented no evidence of hypothalamic disturbance during the subsequent three year period supports the idea that some of the manifestations of the first hospital stay may be considered as release phenomena. Actually there was only one symptom in the whole picture, the drowsiness, which should have made me think more seriously of the hypothalamus in the diagnosis. If I saw another patient with a similar history of diabetes, but no sleep disturbance, I still would not feel entitled to implicate the hypothalamus.

The other interesting thing is the atrophy of the adrenals. This woman is mentioned as having hypertension for 15 years, yet after the first catastrophe she had no hypertension. Destruction of the adrenals could make the hypertension disappear, and also ameliorate the diabetes. I would hesitate to speculate on any relationship between this and the hypothalamic lesion.

I think it also worthwhile to call attention to the fact that this patient had rather striking destruction of part of the hypothalamus, and yet for three years had no symptoms that really could be ascribed to this. This is relevant to a case I discussed here last year[2] and again emphasizes that more than a lesion is often necessary to provoke symptoms.

Doctor McIntyre: What vessel was involved in the cerebellar lesion?

Doctor Scheinker: In this clinic we consider that most, if not all intracerebral hemorrhage is venous in origin. Doctor Aring and I are at the moment studying this matter, which we hope to be able to elucidate shortly.

Doctor Ferris: Isn't it a bit unusual for the adrenals to atrophy just the right amount to reduce hypertension?

Doctor Engel: There are on record several patients with hypertension who subsequently developed Addison's disease. In these patients blood pressure often became normal, in spite of marked symptoms of adrenal insufficiency. On treatment with desoxycorticosterone acetate these patients are likely to re-develop hypertension of considerable magnitude, even with doses inadequate to supply adequate replacement. There is one patient treated with desoxycorticosterone who went into crises while the blood pressure remained in the hypertensive range.

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STAY IN THE FIGHT — HOLD THE WAR BONDS YOU BUY